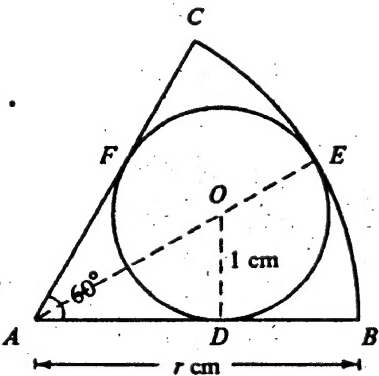


# RESTRICTED 内部文件

87 MATHS (SYLL A/B)

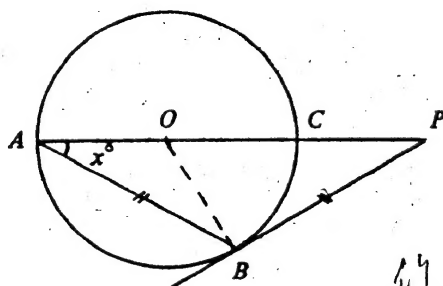
P.1

SOLUTION	MARKS	REMARKS
<p>1. (a) <math>x^2 - 2x + 1 = (x - 1)^2</math></p> <p>(b) <math>x^2 - 2x + 1 - 4y^2 = (x - 1)^2 - 4y^2</math></p> <p style="margin-left: 150px;"><math>= (x - 1 - 2y)(x - 1 + 2y) \dots</math></p> <p style="margin-left: 150px;"><math>= (x - 2y - 1)(x + 2y - 1)</math></p> <p style="margin-left: 150px;"><math>(x-1-2y)(x-1+2y)</math></p>	<p>2A</p> <p>1M</p> <p>1M+1A</p> <p style="text-align: center;"><u>5</u></p>	<p>or <math>(x-1)(x-1)</math></p> <p>for <math>( )^2 - 4y^2</math></p> <p>1M for diff. of 2 sq's. No marks for <math>x^2 - 4y^2 = (x-2y)(x+2y)</math></p>
<p>2. Let <math>f(x) = 2x^3 + ax^2 + bx - 2</math></p> <p>Putting <math>x = 2</math>,</p> <p style="margin-left: 100px;"><math>f(2) = 4a + 2b + 14</math></p> <p>As <math>x - 2</math> divides <math>f(x)</math>, <math>4a + 2b + 14 = 0</math>.</p> <p>Similarly</p> <p style="margin-left: 100px;"><math>f(-1) = a - b - 4</math></p> <p style="margin-left: 100px;"><math>= 0</math></p> <p>Solving the equations, <math>6a + 6 = 0</math></p> <p><math>a = -1</math>, <math>b = -5</math></p>	<p>1A</p> <p>1M</p> <p>1A</p> <p style="text-align: center;"><u>1A+1A</u></p> <p style="text-align: center;"><u>5</u></p>	<p>for <math>f(2) = 0</math></p> <p>or <math>f(-1) = 0</math></p>
<p>(Syll A)</p> <p>3. (a) <math>\sqrt{\frac{3^{5k+2}}{27^k}} = \sqrt{\frac{3^{5k+2}}{(3^3)^k}}</math></p> <p style="margin-left: 100px;"><math>= 3^{k+1} \dots \dots \dots</math></p> <p>(b) <math>\frac{\log a^3 b^2 - \log ab^2}{\log \sqrt{a}} = \frac{\log \frac{a^3 b^2}{ab^2}}{\log \sqrt{a}} \dots \dots \dots</math></p> <p style="margin-left: 150px;"><math>= \frac{\log a^2}{\log \sqrt{a}}</math></p> <p style="margin-left: 150px;"><math>= \frac{2 \log a}{\frac{1}{2} \log a} \dots \dots \dots</math></p> <p style="margin-left: 150px;"><math>= 4</math></p>	<p>1A</p> <p>1A</p> <p>1A</p> <p>1A</p> <p style="text-align: center;"><u>1A</u></p> <p style="text-align: center;"><u>5</u></p>	<p>or</p> <p><math>= \frac{\log a^3 + \log b^2 - \log a - \log b^2}{\log \sqrt{a}}</math></p> <p style="text-align: right;">1A</p> <p><math>= \frac{3 \log a - \log a}{\frac{1}{2} \log a}</math></p> <p style="text-align: right;">1A</p>
<p>(Syll B)</p> <p>3. <math>3^{2x} + 3^x - 2 = 0</math></p> <p style="margin-left: 50px;"><math>(3^x)^2 + 3^x - 2 = 0 \dots \dots \dots</math></p> <p style="margin-left: 50px;"><math>(3^x - 1)(3^x + 2) = 0</math></p> <p style="margin-left: 50px;"><math>3^x = 1</math> or <math>3^x = -2</math></p> <p>(Rejecting <math>3^x = -2</math>)</p> <p style="margin-left: 50px;"><math>x = 0</math></p>	<p>1M</p> <p>1A</p> <p>1A</p> <p>1A</p> <p style="text-align: center;"><u>1A</u></p> <p style="text-align: center;"><u>5</u></p>	<p><math>(3^x)^2</math></p> <p>)</p> <p>) Accept <math>3^x = 1</math></p> <p>)</p>

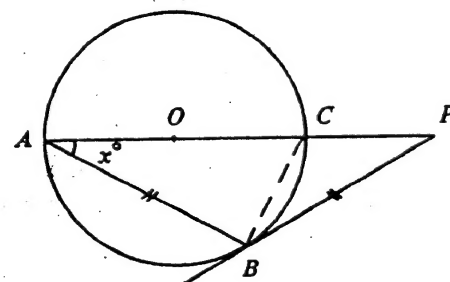
SOLUTION	MARKS	REMARKS
<p>4. <math>\sin^2 \theta = \frac{3}{2} \cos \theta</math></p> <p><math>1 - \cos^2 \theta = \frac{3}{2} \cos \theta</math></p> <p><math>2\cos^2 \theta + 3\cos \theta - 2 = 0</math></p> <p><math>(2\cos \theta - 1)(\cos \theta + 2) = 0</math></p> <p><math>2\cos \theta = 1</math> or <math>\cos \theta = -2</math></p> <p>Rejecting <math>\cos \theta = -2</math>, we have</p> <p><math>\cos \theta = \frac{1}{2}</math></p> <p><math>\theta = 60^\circ</math> or <math>300^\circ</math> (or <math>\frac{\pi}{3}, \frac{5\pi}{3}</math>)</p>	<p>1A</p> <p>1A</p> <p>1A</p> <p>1A</p> <p>1A+1A</p> <p><u>6</u></p>	<p>)</p> <p>) Accept <math>2\cos \theta = 1</math></p> <p>)</p> <p>-1 for each extraneous solution</p>
<p>5. <math>kx^2 - 4x + 2k = 0</math></p> <p>(4) <math>\alpha + \beta = \frac{4}{k}</math></p> <p><math>\alpha\beta = 2</math></p> <p>(a) <math>\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta</math></p> <p><math>= \left(\frac{4}{k}\right)^2 - (2)(2)</math></p> <p><math>= \frac{16}{k^2} - 4</math></p> <p>(b) <math>\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{\alpha^2 + \beta^2}{\alpha\beta}</math></p> <p><math>= \left(\frac{16}{k^2} - 4\right) \cdot \frac{1}{2}</math></p> <p><math>= \frac{8}{k^2} - 2</math></p>	<p>1A</p> <p>1A</p> <p>1M</p> <p>1A</p> <p>1M</p> <p>1M</p> <p><u>1A</u></p> <p><u>6</u></p>	<p>or <math>\frac{16-4k^2}{k^2}</math></p> <p>or equivalent.</p>
<p>6. By symmetry, <math>\angle BAE = 30^\circ</math></p> <p>AS <math>OD \perp AB</math>,</p> <p><math>\sin 30^\circ = \frac{1}{AO}</math></p> <p><math>\therefore AO = 2</math></p> <p><math>AE = AO + OE</math></p> <p><math>= 2 + 1</math></p> <p><math>= 3</math></p> <p><math>AB = AE</math></p> <p><math>\therefore r = 3</math></p>	<p>1A</p> <p>1A</p> <p>1A</p> <p>1M</p> <p>1A</p> <p><u>1A</u></p> <p><u>6</u></p>	

SOLUTION	MARKS	REMARKS
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7.



作線 1分



Join OB.

As OA and OB are radii of the same circle,

$$\angle OBA = \angle PAB = x^\circ \dots\dots\dots$$

Since PB is a tangent,

$$\angle OBP = 90^\circ$$

Given that BA = BP

$$\angle BPA = \angle PAB = x^\circ \dots\dots\dots$$

這解法有三  
個缺點  
1. 未證明  
2. 未證明  
3. 未證明

$$x + x + x + 90 = 180$$

共有

$$\begin{aligned} 3x &= 90 \\ x &= 30 \end{aligned}$$

得2分

Alternatively:

1A Join BC.

As PB is a tangent,  
 $\angle CBP = \angle PAB = x^\circ$ .

1A

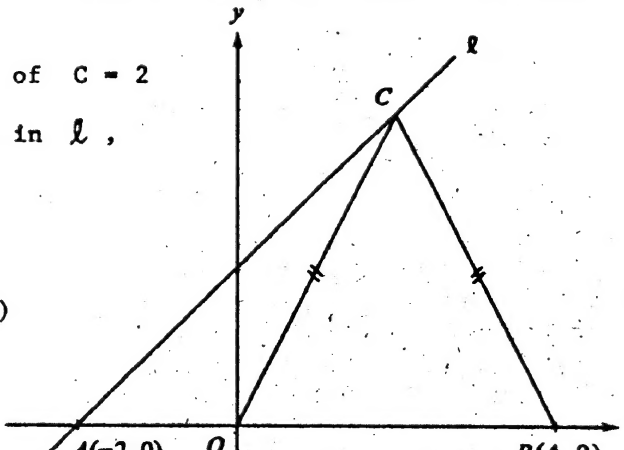
Since AC is a diameter,  $\angle ABC = 90^\circ$  etc.

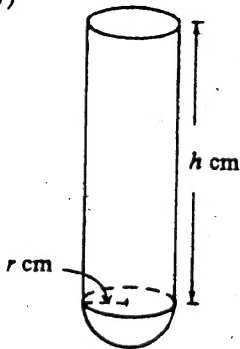
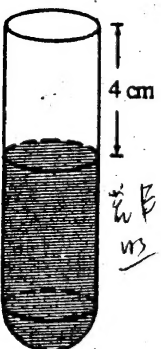
1A

1A

1A

1A  
6

SOLUTION	MARKS	REMARKS
<p>8. (a) Equation of <math>l</math> is <math>y - 0 = (1)[x - (-2)]</math>  <math>\textcircled{2}</math> i.e. <math>y = x + 2</math> (or <math>x - y + 2 = 0</math>)</p>	1A <u>1A</u> <u>2</u>	
<p>(b) As <math>CO = CB</math>, <math>C</math> lies on the perpendicular bisector of <math>OB</math>.  <math>\textcircled{3}</math> x-coordinate of <math>C = 2</math>          Substituting in <math>l</math>,  <math>y = 2 + 2</math>  <math>= 4</math>  <math>\therefore C = (2, 4)</math></p> 	1M  1A  1A <u>3</u>	<p><u>Alternatively:</u>          Let <math>C = (x, y)</math>  <math>\sqrt{x^2 + y^2} = \sqrt{(x-4)^2 + y^2}</math> 1M  <math>8x = 16</math>  <math>x = 2</math> ..... 1A</p>
<p>(c) Let the equation of the circle be  <math>\textcircled{4}</math> <math>x^2 + y^2 + ax + by + c = 0</math>.          Substituting <math>(x, y) = (0, 0)</math> or <math>(4, 0)</math> or <math>(2, 4)</math>,  <math>c = 0</math>  <math>16 + 4a = 0</math>  <math>4 + 16 + 2a + 4b = 0</math>  <math>a = -4</math>  <math>b = -3</math>  <math>\therefore</math> the equation of the circle is  <math>x^2 + y^2 - 4x - 3y = 0</math>.</p> <p><i>Method</i>  <math>(x-h)^2 + (y-k)^2 = r^2</math>  <math>h = 1, k = 1.5</math> — 1M.          Centre <math>(1, 1.5)</math>          radius <math>1.5</math>  <i>eg. circle</i></p>	<p><math>\textcircled{1M}</math>          1A          1A          1A  <u>4</u></p>	<p><u>Alternatively:</u>          The centre of the circle lies on the perpendicular bisector of <math>OB</math> (or <math>OC</math>, <math>BC</math>) 1M          Let it be <math>(2, y)</math>  <math>(2-0)^2 + (y-0)^2 = (2-4)^2 + (y-4)^2</math>  <math>y = 3/2</math>          The centre is <math>(2, \frac{3}{2})</math> 1A          Radius of circle  <math>= \sqrt{4 + \frac{9}{4}} = \frac{5}{2}</math> ..... 1A  <math>\therefore</math> eqn. of circle is  <math>(x-2)^2 + (y-\frac{3}{2})^2 = \frac{25}{4}</math> 1A          or  <math>x^2 + y^2 - 4x - 3y = 0</math></p>
<p>(d) Substituting <math>y = x + 2</math> in the equation of the circle,  <math>\textcircled{5}</math> <math>x^2 + (x+2)^2 - 4x - 3(x+2) = 0</math>  <math>2x^2 - 3x - 2 = 0</math>  <math>(2x+1)(x-2) = 0</math>  <math>x = 2</math> or <math>-\frac{1}{2}</math>          Putting <math>x = -\frac{1}{2}</math> )  <math>y = \frac{3}{2}</math> ) .....  <math>\therefore D = (-\frac{1}{2}, \frac{3}{2})</math></p>	<p>1M   1A  1A <u>3</u></p>	

SOLUTION	MARKS	REMARKS
<p>9. (a) (i) Capacity of hemispherical part</p> <p>(3) (3)</p> $= \left(\frac{1}{2}\right)\left(\frac{4}{3}\right)\pi r^3$ <p>若能写出有 <math>r^3</math> 之方根 则可得 1M.</p> $= \left(\frac{1}{6}\right)(108\pi)$ $r^3 = 27$ $r = 3 \dots\dots\dots$ <p>Capacity of cylindrical part</p> $= \pi r^2 h$ $= 9\pi h \dots\dots\dots$ <p>若 <math>r</math> 有错, 仍给此 1M</p> $9\pi h = \left(\frac{5}{6}\right)(108\pi)$ $h = 10$ <p>(ii) Volume of space = <math>\pi(3^2)(4)</math></p> <p>(3)</p> $\text{Volume of water} = 108\pi - (\pi)(3^2)(4)$ $= 72\pi \text{ cm}^3$ <p>108π - 114 若 <math>r</math> 有错 1M 若不写 <math>\pi</math> 不记</p>	<p>1M+1A</p> <p>1A</p> <p>1M</p> <p>1A</p> <p>1A</p> <p>1M+1M</p> <p>1A</p>	<p>1M for setting up eqn in <math>r^3</math>. 1A for correct eqn.</p> <p>若写 <math>r = \dots \text{ cm}</math> 若错是</p> <p><u>Alternatively:</u> Volume  <math display="block">= \pi(3)^2(10-4) + \frac{108\pi}{6}</math> <math display="block">\dots 1M+1M</math> <math display="block">= 72\pi \text{ cm}^3 \dots\dots\dots 1A</math></p>
<p>(b)</p> <p>(3)</p>   <p>Let radius and depth of water be <math>R</math> and <math>H</math>.</p> $\frac{1}{3}\pi R^2 H = (72\pi)$ <p>若能写出 <math>R^2 H = 216</math> 1M</p> $R^2 H = 216$ <p>Capacity of vessel = <math>\frac{1}{3}\pi(2R)^2(2H)</math></p> $= \frac{8}{3}\pi R^2 H$ $= \frac{8}{3}\pi(216)$ $= 576\pi \text{ cm}^3 \dots\dots\dots$	<p>1M</p> <p>1M</p> <p>1A</p> <p>3</p>	<p>-1 if unit not given</p>
<p><u>Alternatively:</u></p> <p>Since height of vessel = 2 X height of water</p> <p>Capacity of vessel = <math>2^3 \times 72\pi</math></p> $= 576\pi \text{ cm}^3 \dots\dots\dots$	<p>2M</p> <p>1A</p> <p>3</p>	<p>-1 if unit not given</p>

## SOLUTION

## MARKS

## REMARKS

10. (a) Since the triangle is equilateral,  $\angle A_1 = 60^\circ$ ,

$$T_1 = \frac{1}{2} (3)(3)(\sin 60^\circ)$$

$$= \frac{9\sqrt{3}}{4}$$

1M

1A  
2

(b) (i) Since  $A_2B_1 = 2$ ,  $B_1B_2 = 1$  and  $\angle B_1 = 60^\circ$ ,

$$\angle B_1B_2A_2 = 90^\circ$$

$$\therefore A_2B_2 = \sqrt{3} \dots\dots\dots$$

1M

1A

Alternatively:  
By cosine rule,

$$(A_2B_2)^2$$

$$= 2^2 + 1^2 - 2(2)(1)\cos 60^\circ$$

$$= 3$$

$$\therefore A_2B_2 = \sqrt{3}$$

(ii)  $\triangle A_2B_2C_2$  and  $\triangle A_1B_1C_1$  are similar. The ratio of their sides is  $\sqrt{3} : 3$ .

$$\therefore T_2 = \frac{9\sqrt{3}}{4} \left( \frac{\sqrt{3}}{3} \right)^2$$

$$= \frac{3\sqrt{3}}{4} \dots\dots\dots$$

1M

1A  
4

(c) (i) The common ratio =  $\frac{1}{3}$  (1M, 此以十數表之  
在加5)

1M

$$(ii) T_n = \frac{9\sqrt{3}}{4} \left( \frac{1}{3} \right)^{n-1}$$

1M

$$(iii) T_1 + T_2 + \dots + T_n = \frac{9\sqrt{3}}{4} \cdot \frac{1 - \left(\frac{1}{3}\right)^n}{1 - \frac{1}{3}}$$

1M

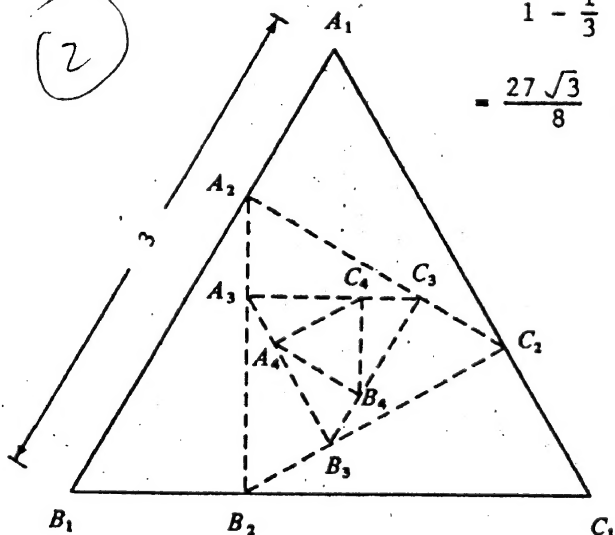
$$= \frac{27\sqrt{3}(1 - \frac{1}{3^n})}{8}$$

1A

$$(iv) \text{ The sum to infinity } = \frac{\frac{9\sqrt{3}}{4}}{1 - \frac{1}{3}}$$

1M

$$= \frac{27\sqrt{3}}{8} \dots\dots\dots$$

1A  
6

## SOLUTION

## MARKS

## REMARKS

11. (a) Consider  $\triangle ADE$ . By the cosine rule

(3)

$$\begin{aligned} AE^2 &= AD^2 + DE^2 - 2AD \cdot DE \cos \angle ADE \\ &= 3^2 + 2^2 - 12 \cos 80^\circ (= 10.91622) \end{aligned}$$

$$AE = 3.304 \text{ cm (correct to 3 d.p.)}$$

1M

correct use of formula

1A

1A

3

(b) Consider  $\triangle ADE$  again. By the sine rule,

(3)

$$\frac{DE}{\sin \angle DAE} = \frac{AE}{\sin \angle ADE} \dots\dots\dots$$

$$\sin \angle DAE = \frac{DE \sin \angle ADE}{AE}$$

$$(\sin \angle DAE = \frac{1.9696}{3.304} = 0.59613)$$

$$\angle DAE = 36.593^\circ \text{ (correct to 3 d.p.)}$$

2M

or cos rule

1A

3

Accept 36.593-36.594

(c)  $DG = AD \sin \angle DAE \dots\dots\dots$

$$(\sin \angle DAE = 0.59613)$$

$$(\sin \angle DAE = (3)(0.59613))$$

$$= 1.788 \text{ cm (correct to 3 d.p.)} \dots\dots\dots$$

1M

or  $\sin \angle DAE = \frac{DG}{AD}$ 

1A

2

(d)  $BD^2 = AB^2 + AD^2 \dots\dots\dots$

$$BD = \sqrt{18}$$

$$= 4.243 \text{ cm (correct to 3 d.p.)}$$

1M

1A

2

(e)  $\sin \angle DBG = \frac{DG}{BD}$

$$(\sin \angle DBG = \frac{1.788}{4.243} = 0.4214)$$

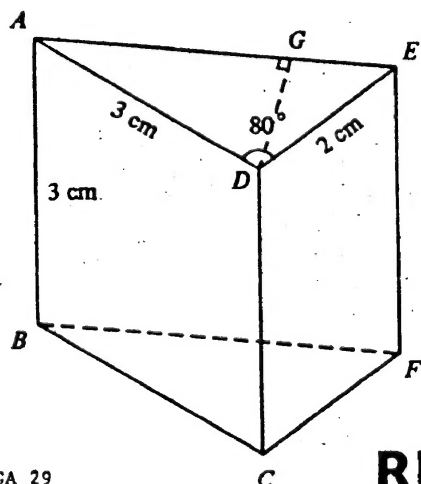
$$\therefore \angle DBG = 24.923^\circ \text{ (correct to 3 d.p.)}$$

1M

1A

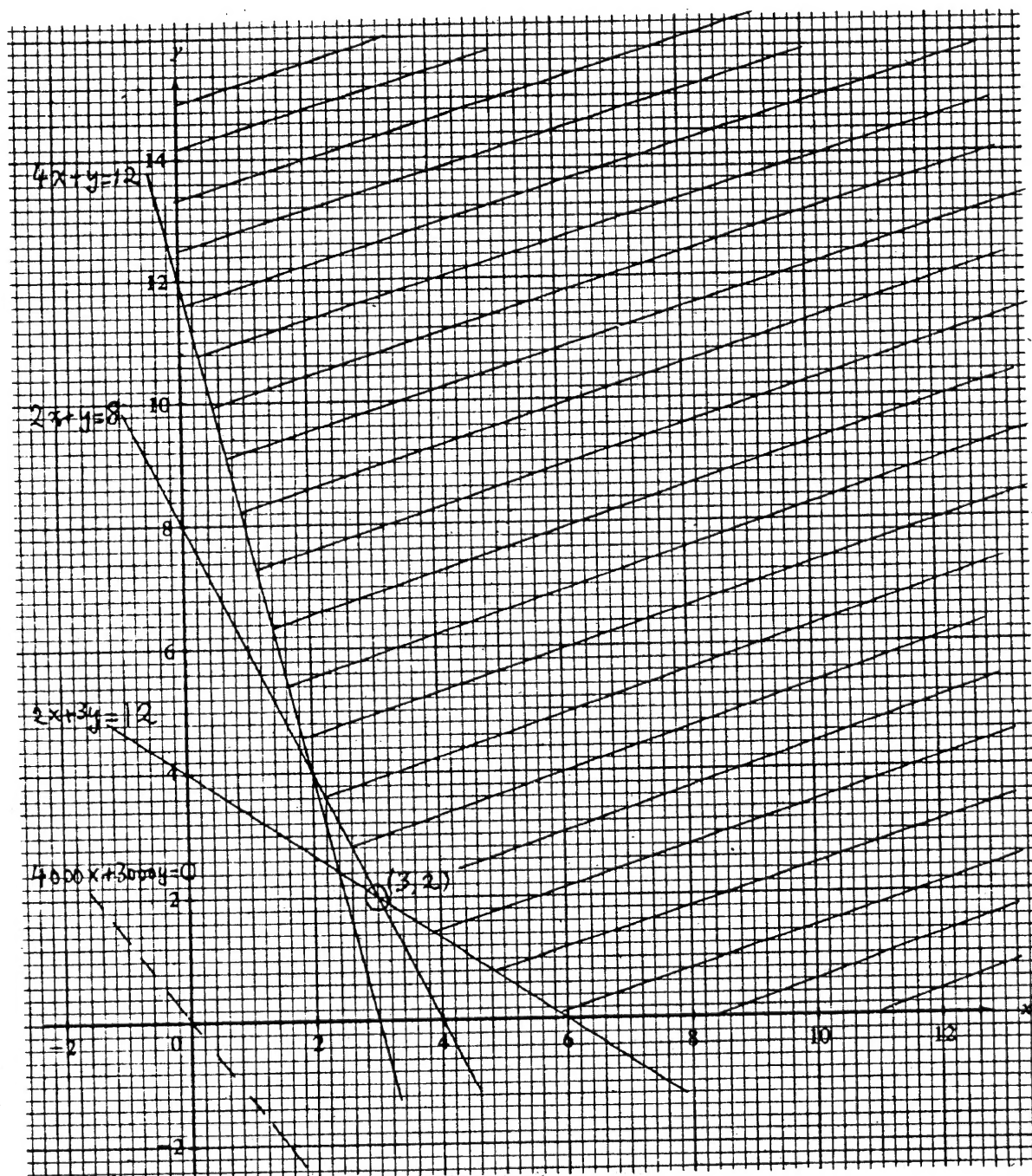
2

Accept 24.920-24.940



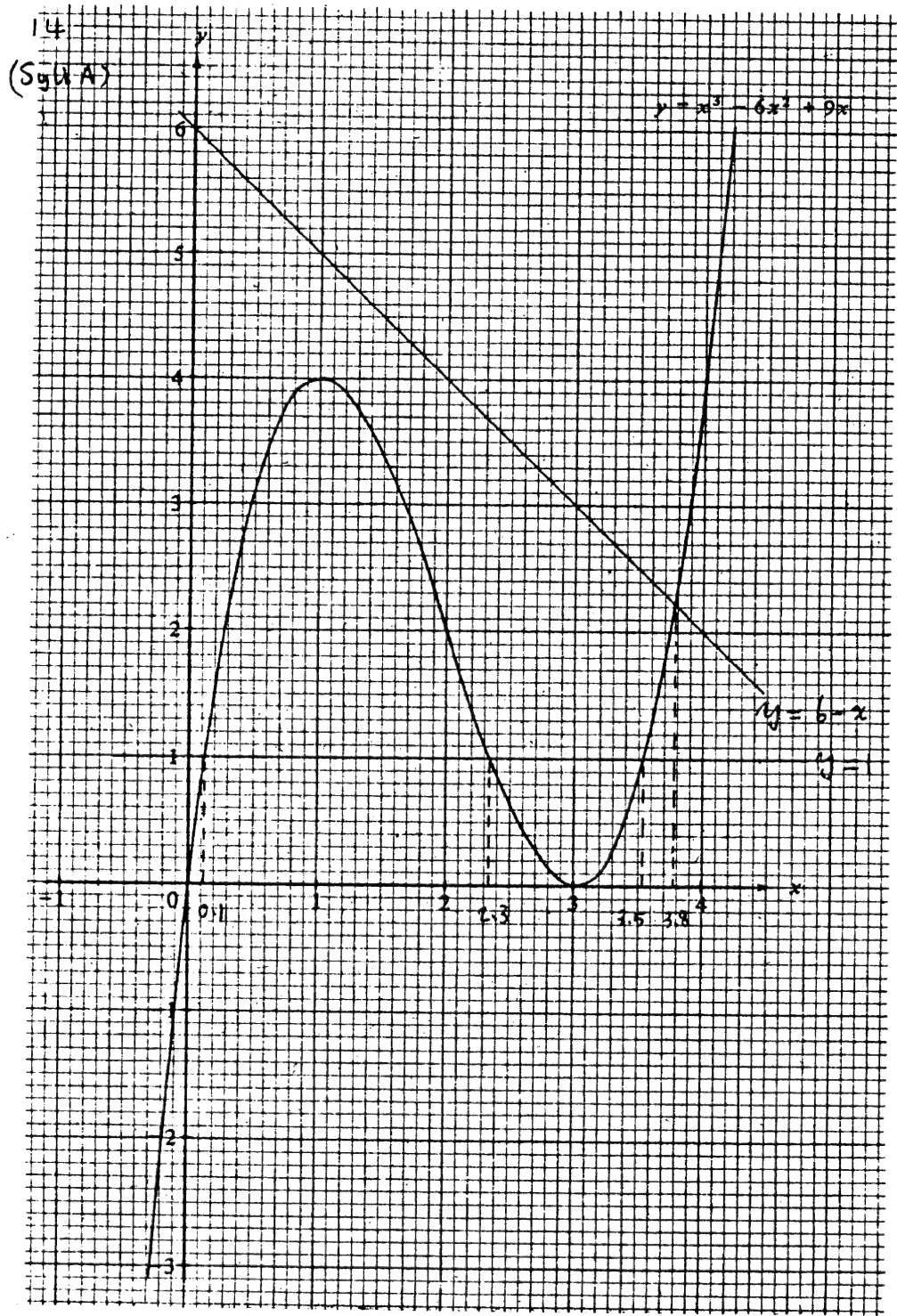
SOLUTION	MARKS	REMARKS										
<p>12. (a) Given that <math>x \geq 0</math></p> <p style="text-align: center;"><math>y \geq 0</math></p> <p><math>4000x + 6000y \geq 24\ 000</math></p> <p>Considering Products B and C ,</p> <p>(2) <math>20\ 000x + 5000y \geq 60\ 000</math></p> <p style="text-align: center;"><math>6000x + 3000y \geq 24\ 000</math></p>	<p>1A</p> <p>1A</p> <p><u>2</u></p>	<p>Withhold 1A if '=' missing</p>										
<p>(b) The constraints in (a) can be written as</p> <p style="text-align: center;"><math>x \geq 0</math></p> <p style="text-align: center;"><math>y \geq 0</math></p> <p><math>2x + 3y \geq 12</math></p> <p><math>4x + y \geq 12</math></p> <p><math>2x + y \geq 8</math></p> <p>The lines corresponding to the last 3 inequalities are shown on the graph paper.</p> <p>Shading the correct region.</p>	<p>1A+1A</p> <p>+1A</p> <p>3A</p> <p><u>6</u></p>	<p>±1 unit at x,y axes</p> <p>-1 if shading not complete.</p> <p>-2 if only arrows used</p>										
<p>(c) Cost of materials used = <math>4000x + 3000y</math> (dollars)</p> <p>Drawing the line <math>4000x + 3000y = 0</math> (or equivalent)</p> <p style="text-align: center;">(要求 slope 要正確) 不需要太準確</p> <p>The cost is least when <math>x = 3, y = 2</math></p> <p>and the least cost is 18 000 (dollars)</p>	<p>1A</p> <p>1M</p> <p>1A</p> <p>1A</p> <p><u>4</u></p>	<p>Candidates may also test all vertices of given region.</p> <p>Awarded only if region correct</p> <table><tr><th>Point</th><th>Cost</th></tr><tr><td>(6,0)</td><td>24 000</td></tr><tr><td>(3,2)</td><td>18 000</td></tr><tr><td>(2,4)</td><td>20 000</td></tr><tr><td>(0,12)</td><td>36 000</td></tr></table>	Point	Cost	(6,0)	24 000	(3,2)	18 000	(2,4)	20 000	(0,12)	36 000
Point	Cost											
(6,0)	24 000											
(3,2)	18 000											
(2,4)	20 000											
(0,12)	36 000											

12.



SOLUTION	MARKS	REMARKS
<p>13. (a) The probability that the black ball is not drawn = <math>\frac{5}{6}</math> (or <math>1 - \frac{1}{6} = \frac{5}{6}</math>)</p> <p>(2)</p>	2A	Any value roundable to 0.83 P.P. if only answer is given. However, accept $P = 5/6$ .
	<u>2</u>	
<p>(b) The probability that the black ball is drawn from P to Q in the 1st draw = <math>\frac{1}{6}</math></p> <p>(4)</p> <p>After that, the probability that the black ball is not drawn from Q to R in the 2nd draw = <math>\frac{4}{5}</math></p> <p><math>\therefore</math> the probability that the black ball is in Q</p> <p><math>= \frac{1}{6} \times \frac{4}{5}</math></p> <p><math>= \frac{2}{15}</math> ( = <math>\frac{4}{30}</math> )</p> <p><math>\frac{1}{6} + \frac{4}{5}</math> 1+1</p> <p><math>\frac{1}{6} \times \frac{4}{5} \times \dots</math> 1+1</p>	1A  1A	
	<u>2A</u> <u>4</u>	
<p>(c) The probability that the black ball is drawn from Q to R = <math>\frac{1}{5}</math> .....</p> <p>(3)</p> <p><math>\therefore</math> the probability that the black ball is in R</p> <p><math>= \frac{1}{6} \times \frac{1}{5}</math> .....</p> <p><math>= \frac{1}{30}</math> = 0.03 <math>\frac{1}{6}</math> 1A <math>\frac{1}{5}</math> 1A</p>	1A  1A	Alternatively: $1 - \frac{5}{6} - \frac{2}{15}$ (IM) 2M
	<u>1A</u> <u>3</u>	
<p>(d) The probability that a white ball is drawn from P to Q in the 1st draw = <math>\frac{3}{6}</math> ( = <math>\frac{1}{2}</math> )</p> <p>(3)</p> <p>After that, the probability that a white ball is drawn from Q to R in the 2nd draw = <math>\frac{1}{5}</math></p> <p><math>\therefore</math> the probability that all balls in R are white = <math>\frac{1}{2} \times \frac{1}{5}</math> 1+1</p> <p><math>= \frac{1}{10}</math> .....</p> <p>0.1 <math>\frac{1}{6} \times \frac{1}{5}</math> <math>\frac{3}{30}</math></p> <p><math>1 - (\frac{3}{6} \times \frac{1}{5} + \frac{3}{6} \times \frac{4}{5})</math></p>	1A  1A	若不表示所求 概率者则 (PP-1)  若能表示所求 而有不正确答案 给全部分
	<u>1A</u> <u>3</u>	

SOLUTION		MARKS	REMARKS								
(Syllabus A)											
14. (a) (i)	$x^3 - 6x^2 + 9x - 1 = 0$										
(3)	$x^3 - 6x^2 + 9x = 1$	1M									
	Drawing the line $y = 1$ , the roots of the given equation were found to be 0.1, 2.3 and 3.5 (correct to 1 d.p.).	1A+1A	1 mark for 2 correct answers								
(11)	$x^3 - 6x^2 + 10x - 6 = 0$										
(3)	$x^3 - 6x^2 + 9x = 6 - x$ .....	1M	for correct L.S.								
	Drawing the line $y = 6 - x$ , the root was found to be 3.8 (correct to 1 d.p.)	1A 1A <u>6</u>	for graph, $\pm$ /unit at (3,3), (4,2)								
(b)											
(3)	<table border="1"><thead><tr><th>x</th><th><math>x^3 - 6x^2 + 10x - 6</math></th></tr></thead><tbody><tr><td>3.76</td><td>- (= -0.068)</td></tr><tr><td>3.77</td><td>+ (= 0.005)</td></tr><tr><td>3.765</td><td>- (= -0.031)</td></tr></tbody></table>	x	$x^3 - 6x^2 + 10x - 6$	3.76	- (= -0.068)	3.77	+ (= 0.005)	3.765	- (= -0.031)	1M 1A <u>3</u>	Change of sign, -ve for 3.765-3.769 May use graphical method
x	$x^3 - 6x^2 + 10x - 6$										
3.76	- (= -0.068)										
3.77	+ (= 0.005)										
3.765	- (= -0.031)										
	$\therefore x = 3.77$ (correct to 2 d.p.)										
(c)	Consider $x^3 - 6x^2 + 9x = k$	1M									
	From the graph, if $0 < k < 4$ , the line $y = k$ meets the curve $y = x^3 - 6x^2 + 9x$ at three distinct points.	1A+1A	-1 for ' $<$ ' if otherwise correct. may omit								
	$\therefore x^3 - 6x^2 + 9x - k = 0$ has three distinct roots.	<u>3</u>									



記下此兩交點之數  
1.5 3.8

(Syllabus B)	SOLUTION	Marks	REMARKS
14.	(a) Since $y \propto x$ and $z \propto \frac{1}{x}$ , $y = k_1 x$ and $z = \frac{k_2}{x}$ (for some real $k_1, k_2$ ). $\therefore p = k_1 x + \frac{k_2}{x}$	1A+1A	Accept $y = kx, z = \frac{k}{x}$
	Putting $x = 2, p = 7$ , (or $x = 3, p = 8$ )	1M	
	$7 = 2k_1 + \frac{k_2}{2}$	1A	
	i.e. $4k_1 + k_2 = 14$		
	Putting $x = 3, p = 8$ .		
	$8 = 3k_1 + \frac{k_2}{3} \dots\dots\dots$	1A	
	or $9k_1 + k_2 = 24$		
	Solving these two equations,		
	$5k_1 = 10$		
	$k_1 = 2$	1A	
	$k_2 = 6$	1A	
	$\therefore p = 2x + \frac{6}{x}$		
	When $x = 4, p = 2(4) + \frac{6}{4}$		
	$= \frac{19}{2} \dots\dots\dots$	$\frac{1A}{8}$	
	(b) $2x + \frac{6}{x} < 13$	1M	
	$2x^2 - 13x + 6 < 0$ (as $x > 0$ )	1A	
	$(2x - 1)(x - 6) < 0$		
	$\therefore \frac{1}{2} < x < 6$	$\frac{2A}{4}$	-1 for ' $\leq$ '